

What Is Claimed Is:

1. A laser comprising:

5 a front mirror and a rear mirror being disposed so  
as to establish a reflective cavity therebetween;

10 a gain region disposed between said front mirror  
and said rear mirror, said gain region being  
constructed so that when said gain region is  
appropriately stimulated by light from a pump laser,  
said gain region will emit light; and

15 said rear mirror having a phase compensated  
reflector to act as an output coupler for a lasing mode  
and to reflect pump light at a proper phase so as to  
provide phase shifted reflected pump light for a second  
pumping pass through said gain region;

wherein said gain region is positioned relative to  
said rear mirror with said peaks of said reflected pump  
light in alignment with said gain region during said  
second pumping pass therethrough; and

20 wherein said gain region is positioned relative to  
said front mirror and said rear mirror so as to provide  
proper lasing.

2. A laser according to claim 1 wherein said gain region is formed by multiple quantum wells (MQW).

5 3. A laser according to claim 1 wherein said rear mirror is configured to reflect light at said wavelength of said pump laser with a phase of  $270^\circ$ .

10 4. A laser according to claim 1 wherein said rear mirror is configured to reflect light at a wavelength for lasing with phase of  $180^\circ$ .

15 5. A laser according to claim 1 wherein said rear mirror comprises a distributed Bragg reflector.

20 6. A laser according to claim 5 wherein said distributed Bragg reflector comprises a plurality of layers, and one of said plurality of layers has a greater thickness so as to form said phase compensated reflector.

7. A laser according to claim 5 wherein said one of said plurality of layers is a third layer.

8. A laser according to claim 1 wherein said front mirror comprises a semiconductor distributed Bragg reflector.

5 9. A laser according to claim 8 wherein said semiconductor distributed Bragg reflector comprises one of a group consisting of Si, GaAs, InP, AlGaAs, InGaAsP, InAlGaAs, InAlAs, AlGaAsSb and AlAsSb.

10 10. A laser according to claim 1 wherein said rear mirror comprises a semiconductor distributed Bragg reflector.

15 11. A laser according to claim 10 wherein said semiconductor distributed Bragg reflector comprises one of a group consisting of Si, GaAs, InP, AlGaAs, InGaAsP, InAlGaAs, InAlAs, AlGaAsSb and AlAsSb.

20 12. A laser according to claim 10 wherein said semiconductor distributed Bragg reflector comprises a plurality of layers, and one of said plurality of layers has a greater thickness so as to form said phase compensated reflector.

